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FIG. 1

Internet

to Backbone
Network

PSTN

CN
(Core Network)

GGSN
225

SGSN
220

GK and
IP/PSTN GW
230

RAN
(Radio Access Network)

RNC
215

Node B
210

wireless

MS
205

200

FIG. 2

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Prior Art

QoS IE
300

8	7	6	5	4	3	2	1	
Quality of Service IEI								Octet 1
Length of Quality of Service IE								Octet 2
0	0 spare		Delay Class		Reliability Class			Octet 3
Peak Throughput				0 spare	Precedence Class			Octet 4
0	0	0 spare		Mean Throughput				Octet 5
Traffic Class			Delivery Order		Delivery of erroneous SDU			Octet 6
Maximum SDU size								Octet 7
Maximum Bit Rate for uplink								Octet 8
Maximum Bit Rate for downlink								Octet 9
Residual BER				SDU error ratio				Octet 10
Transfer delay					Traffic Handling Priority			Octet 11
Guaranteed bit rate for uplink								Octet 12
Guaranteed bit rate for downlink								Octet 13

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FIG. 3

Packet Data Protocol (PDP) Context Activation Procedure
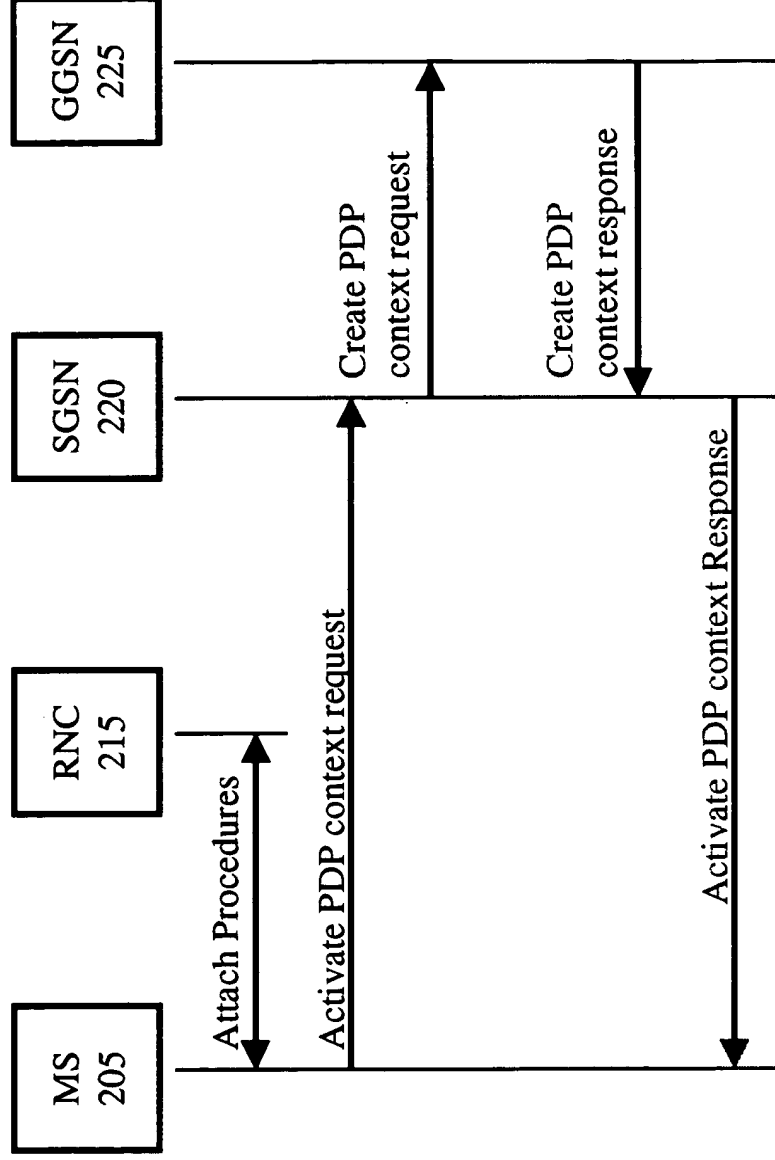
FIG. 4

Asymmetric QoS IE
400

8	7	6	5	4	3	2	1	
Quality of Service IEI								Octet 1
Length of Quality of Service IE								Octet 2
0 0 spare		Delay Class			Reliability Class			Octet 3
Peak Throughput				0 spare	Precedence Class			Octet 4
D	T	R	spare	Mean Throughput				Octet 5
Downlink Traffic Class			Downlink Delivery Order		Downlink Delivery of erroneous SDU			Octet 6
Maximum SDU size								Octet 7
Maximum Bit Rate for uplink								Octet 8
Maximum Bit Rate for downlink								Octet 9
Downlink Residual BER				Downlink SDU error ratio				Octet 10
Downlink Transfer delay					Traffic Handling Priority			Octet 11
Maximum Desired Guaranteed bit rate for uplink								Octet 12
Maximum Desired Guaranteed bit rate for downlink								Octet 13
Minimum Desired Guaranteed bit rate for uplink								Octet 14
Minimum Desired Guaranteed bit rate for downlink								Octet 15
Uplink Traffic Class			Uplink Delivery Order		Uplink Delivery of erroneous SDU			Octet 16
Uplink Residual BER				Uplink SDU error ratio				Octet 17
Uplink Transfer delay					Spare			Octet 18

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FIG. 5

D bit	Traffic Class Field Value	Traffic Class
0	000	Subscribed traffic class/Reserved
0	001	Conversational
0	010	Streaming
0	011	Interactive
0	100	Background
0	101	Reserved
0	110	Reserved
0	111	Reserved
1	000	Subscribed traffic class/Reserved
1	001	Conversational
1	010	Streaming
1	011	Interactive
1	100	Background
1	101	First try Streaming, then Interactive
1	110	First try Interactive, then Background
1	111	First try Streaming, then Interactive, then Background

FIG. 6

Asymmetric QoS IE 500

8	7	6	5	4	3	2	1	
Quality of Service IEI								Octet 1
Length of Quality of Service IE								Octet 2
U	0 spare	Delay Class			Reliability Class			Octet 3
Peak Throughput				0 spare	Precedence Class			Octet 4
Mean Throughput								Octet 5
D	T	R	Downlink Delivery Order		Downlink Delivery of erroneous SDU			Octet 6
Downlink Traffic Class								
Maximum SDU size								Octet 7
Maximum Bit Rate for uplink								Octet 8
Maximum Bit Rate for downlink								Octet 9
Downlink Residual BER				Downlink SDU error ratio				Octet 10
Downlink Transfer delay						Traffic Handling Priority		Octet 11
Maximum Desired Guaranteed bit rate for uplink								Octet 12
Maximum Desired Guaranteed bit rate for downlink								Octet 13
Minimum Desired Guaranteed bit rate for uplink								Octet 14
Minimum Desired Guaranteed bit rate for downlink								Octet 15
Uplink Traffic Class			Uplink Delivery Order		Uplink Delivery of erroneous SDU			Octet 16
Uplink Residual BER				Uplink SDU error ratio				Octet 17
Uplink Transfer delay						Spare		Octet 18

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FIG. 7

U bit	D bit	Traffic Class Field Value	Traffic Class
0	0	000	Subscribed traffic class/Reserved
0	0	001	Conversational
0	0	010	Streaming
0	0	011	Interactive
0	0	100	Background
0	0	101	Reserved
0	0	110	Reserved
0	0	111	Reserved

U bit	D bit	Traffic Class Field Value	Traffic Class
1	0	101	Interactive to Streaming
1	0	110	Best Effort to Interactive
1	0	111	Best Effort to Streaming, else to Interactive

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FIG. 8

Packet Data Protocol (PDP) Context Activation Procedure
with asymmetric QoS IE
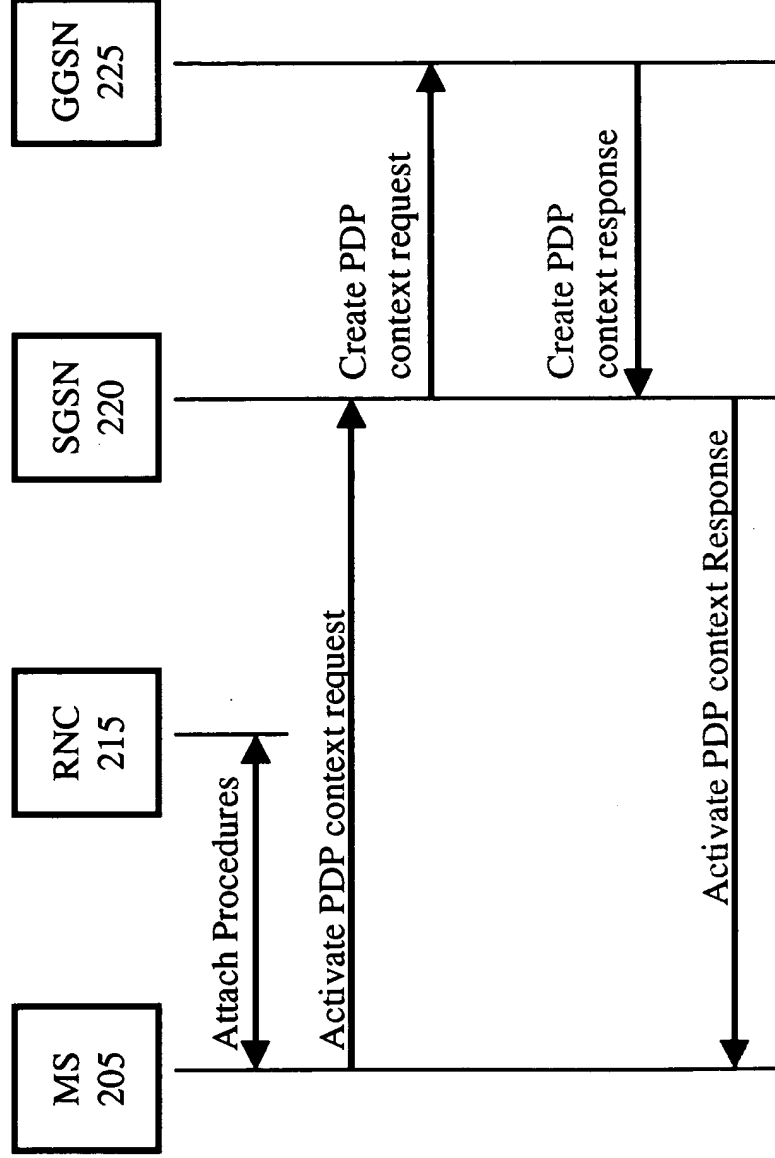
Asymmetric QoS negotiation

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FIG. 9